# ECON5200/9200B – Advanced Microeconomics, Fall 2022

**Problem 1**

Read the paper by Bratsberg, Moxnes, Raaum and Ulltveit-Moe (2022) "Opening the floodgate: Partial and General equilibrium adjustment to Labour Immigration", International Economic Review, July 2022. The following problems are related to the theory part of the paper.

a) Derive the labour demand in equation (2).

The variable *P* enter in equation (2) as a wage index while in (7) it is the price of the final good.

b) Why is the price P both the price of the final good and a CES wage index?

In the model there is only one production function, as if there is only one representative firm hiring workers of all occupations. In reality, nurses and carpenters are in different firm.

c) Are there strong implicit assumption behind this use of a representative firm?

The definition of general equilibrium is different in the paper and in the set-up in Mas-Collell. In general equilibrium in Mas-Collell, the parameter $\theta_{ij}$ captures how much individual i own of firm j. These parameters are used to determine total demand. Such parameters are not explicitly stated here.

d) Is ownership implicitly defined or, if not, why is that not needed? Explain why equation (7) characterizes equilibrium in the product market.

In Mas-Collell's definition of general equilibrium consumers have preferences over goods consumed. The paper uses a specification where there is only one consumption good but where workers also have preferences over occupations. With preferences defined over occupation, the proof of first welfare theorem in Mas-Collell does not immediately apply.

e) Discuss, in the setting of the paper, the Pareto efficiency of general equilibrium.

The paper considers both the partial and general equilibrium effects of a shift in labour supply.

f) What equations characterize the partial equilibrium, and what equations characterize the general equilibrium? What do we gain in this setting from studying the general equilibrium, compared to partial equilibrium?

# *Problem 2*

**Weight: 1/3 (with equal weight on each subproblem)**

Please read carefully the two following articles:

(1) Jean-Pierre Benoît and Vijay Krishna, "Finitely Repeated Games," *Econometrica* **53**, 1985, 905–922, and

(2) Drew Fudenberg and Eric Maskin, "The Folk Theorem in Repeated Games with Discounting or with Incomplete Information," *Econometrica* **54**, 1986, 533–554.

Consider two classes of games: (i) The class of undiscounted finitely repeated games and (ii) the class of $\delta$-discounted infinitely repeated games, where $0 < \delta < 1$. 'Folk theorems' for these classes of games are proven in Benoît and Krishna (1985) and Fudenberg and Maskin (1985). See also Sections 8.8–8.10 of Osborne & Rubinstein and Appendix A of Chapter 12 of Mas-Colell et al.

(a) For each of these classes of games, what is meant by the 'folk theorem'?

(b) For each of these classes of games, explain what assumptions are needed to establish this result for games with 3 or more players. In particular, what is the role of the dimensionality assumption?

(c) Sketch how the result is established by means of three phase punishments in class (i) and two phase punishments in class (ii).

(d) Why is the dimensionality assumption not needed for games with only two players?

## Problem 3

This question is inspired by the article by Hart, Shleifer, and Vishny (1997) on the reading list. Suppose B's value is $(1-i)\,\gamma$ when the seller invests $i$ at cost $i^2$, while S's cost of providing a unit of good to B is $c-i$. Thus, S's investment reduces both S's cost and B's value.

i) What is the socially optimal $i$?

ii) Suppose S-ownership means that after $i$ has invested, S has the right to decide on whether to implement the cost reduction associated with $i$, if the two does not succeed in negotiating this decision. Suppose B-ownership means that B has this right to decide, if they do not negotiate successfully. In equilibrium, we can expect them to negotiate efficiently and share the total surplus (if any) from the bargaining. Which of the two ownership structures do you expect to be optimal? Why? What will the answer depend on, you think?

iii) Derive $i$ under the two arrangements and compare. Explain the intuition for the result, and also explain (verbally) how the results would change if you made the model more realistic one way or another.